EDDYSTONE RECEIVER MODEL 730/1A

INSTALLATION AND OPERATION

The receiver has been carefully calibrated, aligned and thoroughly tested and the only adjustment that may be necessary before putting the receiver into operation is to the mains input voltage tapping. The plug in the selector panel on the mains transformer (easily accessible with the lid open) is fitted normally in the 230 volt position, where it should remain when the mains supply voltage is between 220 and 250 volts. If the mains voltage lies between 195 and 215 volts, the plug should be changed to the 200 volt marking. The 110 volt tap applies when the mains supply is between 100 and 120 volts. Unless specially ordered, the transformer is unsuitable for 25 cycle mains. D.C. mains supplies are entirely unsuitable and if connected will cause serious damage to the mains transformer.

A loudspeaker — preferably the Cat. No. 814 — having an Impedance of 2.5/3 ohms is connected to the terminals marked "L.S." at the rear or, alternatively, a pair of telephones plugged into the jack on the front panel. The brilliance of the dial lights is adjustable by manipulation of the knob at the rear.

At the rear also are terminals, suitably marked, for feeding the output into a 600 ohm line.

AERIAL CONNECTIONS.

The input impedance at the aerial terminals is nominally 70/80 ohms on Ranges 1, 2 and 3 and 400 ohms on Ranges 4 and 5. Two coaxial sockets, connected in parallel, are fitted at the rear to take the feeder coming in from the aerial system.

RECEPTION OF CW TELEGRAPHY.

The panel controls should be set as follows:-

AGC "off." BFO "on."

Crystal Phasing Knob White spot at "off."

BFO Pitch Control . . Spot slightly to one side of centre.

RF Gain .. . Adjust as necessary.
AF Gain .. . Adjust as necessary.
Selectivity .. . Maximum or intermediate.

The settings of the controls depend on a number of factors including the strength of the incoming signals, amount of interference present and the efficiency of the aerial. If the latter is poor, it will be advisable to use maximum RF gain, but often the RF gain can be reduced with advantage. It should always be reduced when signals are strong.

The BFO on/off switch forms part of the pitch control capacitor. The latter permits a swing of about 3,000 cycles each side of zero beat and will normally be set to give a pitch of 1,000 c.p.s. or near. Careful handling of this control will sometimes enable a desired signal to be separated from an interfering signal and one side of zero beat may be better than the other side.

USE OF CRYSTAL FILTER.

It is advantageous to employ a high degree of selectivity because the noise output from the receiver is partly dependent on the IF bandwidth and the narrower this is made, the less the noise for the same amount of gain. It will therefore generally be desirable when receiving CW telegraphy, to operate with selectivity at maximum.

A further increase in selectivity is obtained when the crystal filter is switched in. Moving the phasing knob away from the indicated "off" position brings the crystal into circuit. The slope of the selectivity curve (with crystal in) can be varied by movement of the phasing control to give extremely high attenuation one side or the other of the centre frequency. This feature is invaluable when interfering signals are objectionable.

AUDIO FILTER.

The highly efficient tuned audio filter will be found very useful when receiving telegraphic signals. It is tuned to approximately 1,000 cycles, has steep slopes giving a pass-band of about 100 cycles at 6 db points, and has a low insertion loss at 1,000 cycles. The switch on the front panel brings the filter into operation, the effect being to reduce drastically both background noise and interfering signals whilst leaving the desired signal clear and sharp.

RECEPTION OF TELEPHONY.

The panel controls should be set as follows:

.. " on." AGC .. " off." BFO .. RF Gain .. maximum. ..

Crystal Phasing Knob Spot against "off" position. adjusted to give requisite volume. AF Gain

AF Filter " off."

For best possible audio quality, the variable selectivity control should be set at minimum. When heterodyne interference is experienced, the selectivity should be increased by moving the switch to one of the intermediate positions. A certain amount of gain compensation is automatically provided with movement of the switch. It may be mentioned that a very strong signal may overload the first stage of the receiver, necessitating a reduction of RF gain.

The tuning scales are calibrated directly in frequency to a high degree of accuracy and the flywheel controlled drive permits fine tuning on all ranges.

The mechanical bandspread device assists in the logging of particular stations. One complete revolution of the rotating scale (at the top of the dial) corresponds to a movement of the main pointer over one marked division of the lowest scale on the main dial, the length of the latter being opened out to the equivalent of 360 inches. The settings of a given station can be recorded for future use.

USE OF SIGNAL STRENGTH METER.

The Signal Strength Meter comes into operation only with the selectivity control in the maximum position, where the peaked response assists in tuning a signal accurately. The sensitive meter movement is protected by one half of a double diode valve in series with it, to prevent current flowing in the reverse direction. The RF gain should be fully advanced when using the "S" Meter.

To adjust the meter initially, the aerial and earth terminals should temporarily be shorted and the needle of the instrument made to coincide with zero by movement of the rear adjuster.

CRYSTAL CALIBRATOR.

A crystal calibrator is fitted and gives check points (oscillator beats) 500 kc/s apart, audible over the entire frequency range. The accuracy of the oscillator has been checked during factory alignment but a small trimmer is provided for adjustment, should this be found necessary at any time.

The calibrator is brought into use by pressing the switch on the front panel, and a check can then be made against any calibration mark which is an exact multiple of 500 kc/s. Incoming signals are muted to avoid confusion.

Any error in calibration is corrected by rotation of the small knurled knob on the right hand side above the dial, until the hair-line on the cursor agrees exactly with the appropriate mark on the scale.

AUDIO INPUT TERMINALS.

The two terminals situated below the "L.S." terminals at the rear are useful for feeding in any external audio voltage when it is desired to use only the AF section of the receiver. The input impedance is approximately 100,000 ohms.

EDDYSTONE MODEL 730/1A RECEIVER

GENERAL SERVICING

The "730/1A" receiver operates from A.C. mains of 40/60 cycles, the consumption being approximately 80 watts. The fuse is in series with the A.C. supply and is rated at 1 ampere standard type or 750 mA Magnickel type.

Two types of lamps are fitted behind the scale. Those for general illumination are small bayonet cap types, rated at 6.5 volts 0.3 amperes. To change a lamp it is only necessary to press the sides of the holder (accessible when the lid is lifted) and pull the lamp out.

Miniature lamps are used to Indicate the range selected. These are fitted to an insulating strip, which can be drawn away complete after removing the knurled nut at the top of the strip. The cabinet has to be removed for this operation.

Should the performance fall off or perhaps fail completely, it will be well in the first place to inspect the valves for the normal heater glow. Where a metal screening can is fitted to a valve, it is easily removable with a twist and a pull. The VR150/30 valve normally exhibits a violet glow.

If it becomes necessary to obtain access to the interior, the cabinet can be completely removed after withdrawal of the four large screws at the rear. A check should be made against the operating voltages given in the table and any serious discrepancy will indicate at which stage in the circuit a fault has developed.

RE-ALIGNMENT.

The tuned circuits in the "730/1A" receiver will hold their proper alignment over a long period of time and it is inadvisable to make adjustments unless the need thereof is justified. The alignment of a receiver of this type is a skilled operation and it is most unwise to judge the effect of adjustments by ear alone. It is therefore assumed test instruments are available. Essential items are: — A Signal Generator covering from 450 kc/s to 32 Mc/s, provided with internal audio modulation (30%) and with a calibrated attenuator; an Audio Output Meter, scaled in milliwats and decibels and adjustable to match the receiver output impedance of 2-5 ohms. Trimming should be carried out with a non-metallic tool such as the Eddystone Cat. No. 122T, which is supplied with the receiver.

IF AMPLIFIER.

The alignment of a modern variable selectivity IF amplifier as in the "730/1A" requires the use of a frequency modulated signal generator ("Wobbulator") and an oscilloscope, presenting a visual display to the operator.

It is unlikely that a fault will develop in one of the IF transformers and the adjustments of these should not be disturbed unless absolutely necessary. For check purposes, however, the following information and sensitivity figures may occasionally be useful. To obviate unsoldering the grid leads to the IF valves, the figures have been taken with these wires connected and are therefore not strictly true ones. Nevertheless, they are quite adequate for comparison purposes. The intermediate frequency is 450 kc/s (± 1.5 kc/s=crystal tolerance).

The following conditions apply when taking measurements:

Wavechange Switch Range 1.

AGC, BFO, NL off.

Receiver

Crystal phasing knob at "Off."

Selectivity maximum. RF Gain maximum.

Signal Generator

30% Modulation. Direct output.

Output Meter across and matched to speaker terminals.

Input for 50 mW output (approximate):

Between grid V6 and chassis 11 millivolts. Between grid V5 and chassis 220 microvolts. To measure the overall sensitivity of the IF amplifier at the signal grid of the frequency changer (V3), it will be necessary to unsolder a lead in the frequency-changer compartment of the coil box. This lead is identified in Fig. 4 by an arrow and cross. The Signal Generator leads are connected between this lead and chassis. The sensitivity at this point should be in the region of 20 microvolts.

BFO ADJUSTMENT.

With the BFO switch off, the modulated (IF) signal applied to the receiver should be tuned in accurately with the aid of the "S" Meter, selectivity remaining at maximum. The modulation is switched off, the BFO switched on, and with the pitch control condenser at half mesh, indicated by the white spot being central at the top, the core in the BFO unit (see Fig. 4) is adjusted, if found necessary, to give zero beat against the applied signal.

ALIGNMENT OF RF SECTION.

All receiver controls are left as for IF check. The dummy aerial of the signal generator is connected between aerial and earth at the rear of the coil box. It will be found helpful to connect the speaker as well as the Output Meter for the first stage of the following procedure, which is calibration. For this, a 1,000/100 kc/s crystal oscillator, with harmonics usable up to 30 Mc/s, is essential, since the desired maximum calibration error on the dial of the receiver is 0.5%. To allow for subsequent calibration adjustments against the internal oscillator, care should be taken to ensure the vernier pointer adjuster is set at the mid point of its travel.

The location of the various trimmers and cores are shown in Fig. 4. Connect the crystal oscillator in shunt with the dummy aerial, switch on the BFO with the white spot at "12 o'clock" and, using the RF gain only as volume control, check on Range 1. Should the 28 Mc/s and 14 Mc/s harmonics be appreciably off their marks when tuned to zero beat, proceed to correct the 14 Mc/s harmonic by means of the Range 1 oscillator coil CORE. The 28 Mc/s harmonic is corrected by means of the TRIMMER. With these two points accurately fixed, the remainder of the calibrations will automatically conform to the desired 0.5% accuracy. The same procedure is used on all other ranges, the two setting points on each range being as follows:

Range 1 — 28 Mc/s and 14 Mc/s.
Range 2 — 12 Mc/s and 6 Mc/s.
Range 3 — 5.6 Mc/s and 2.5 Mc/s.
Range 4 — 2.5 Mc/s and 1.2 Mc/s.
Range 5 — 1,000 kc/s and 500 kc/s.

ALIGNMENT OF RF. AND MIXER SECTIONS.

Remove the crystal oscillator leads and use only the signal generator with the attenuator set to give about 10 microvolts. Switch off BFO. Then proceed as follows:

Inject a 13-3 Mc/s modulated signal into the receiver and tune in on Range 1 for maximum deflection on the output meter, using the RF gain to keep the needle on the scale. Now proceed to adjust the CORES only of the two RF coils and the one FC coil for highest output as indicated on the output meter. Next, inject a 28 Mc/s signal and peak this by means of the three appropriate trimmers. Repeat the whole procedure until no improvement is possible. Use the same procedure on all ranges. The high and low frequency alignment points on each range are as follows:

Range	Trimmer Frequency	Core Frequency
1	28 Mc/s	13-3 Mc/s
2	12 Mc/s	6.0 Mc/s
<u>3</u>	5-4 Mc/s	2-6 Mc/s
4	2-3 Mc/s	1.2 Mc/s
5	1,000 kc/s	520 kc/s

Always adjust the TRIMMERS at the high frequency ends of the bands and the CORES at the low frequency ends. This hard and fast rule applies in the alignment of all the signal frequency and oscillator coils.

Sole Manufacturers: STRATTON & CO. LTD., BIRMINGHAM, 31

Cables: Stratnoid, Birmingham

August, 1955

CIRCUIT No. BP. 826E.

VOLTAGE VALUES.

The voltages are between the point indicated and the chassis. Set the receiver at 1,000 kc/s on Range 5 with the aerial shorted out, R.F. control set at maximum, A.F. control set at minimum. B.F.O. and Calibrator on only for D- and B- respectively. Two sets of values are given using different meters as shown.

It will be evident that the actual voltage indicated depends on the meter employed. A tolerance of plus or minus 5% should be allowed on the values given.

POINT.	WESTON (20,000 ohms/volt.)	AVO (Model 40).
A.	218	215
В.	90	85
C. D. E. F.	1	1
D.	218	215 88
E.	95 1	1
G.	226	224
н. Н.	100	100
j."	1	1
K.	100	92
L.	218	216
М.	96	90
N.	~ 1	.1
0.	218	216 85
P.	90 1	1
Q. R	14	14
R. S. T.	80	21
T.	80	32
U.	225	206
٧.	4-2	1.5
w.	4 242	2 246
X. Y. Z. A	242 235	241
7	242	246
Ā.–	10	9-4
B	25	15
B C	160	150
D	85	85. 252 A.C.
E	255 A.C. 275	252 A.C. 272
F.– G.–	148	148
H	140	125
	VALVES.	
VALVE No	o. TYPE	SERIES
1.	6BA6	B7G
2.	6BA6	B7G
3.	· 6BE6	B7G
4. 5.	6AM6 (8D3) 6BA6	B7G B7G
5.	6BA6	B7G
6. 7.	6AL5	B7G
8.	12AU7	B9A (Noval)
9.	6AM5 (7D9)	B7G
10.	6AM6 (8D3)	B7G
11.	6AL5	B7G
12.	6BA6	B7G Octal
13.	5Z4G VR150/30	Octal
14.	V K 130/30	Octal

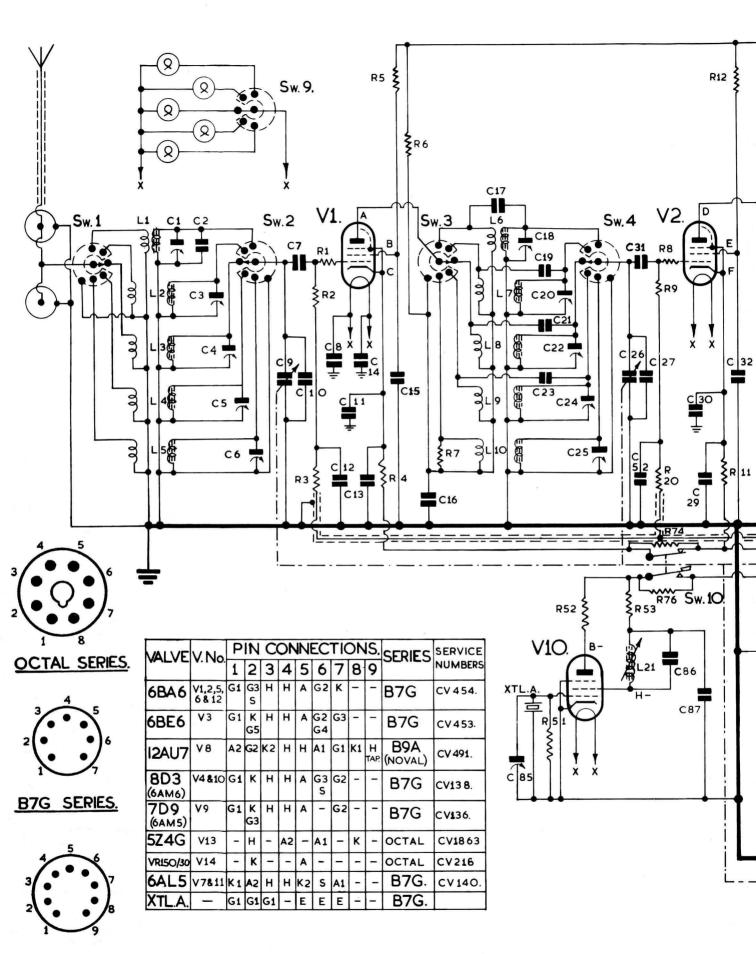
CIRCUIT No. BP. 826E.

COMPONENT VALUES.

CAPACITORS		C60.	500 pF Silvered Mica ± 2%
		C61.	-1 mfd Tub. paper
C1.	3-23 pF Air Trimmer	C62.	-1 mfd Tub. paper
C2.	10 pF Silvered Mica	C63.	400 pF Silvered Mica ± 2%
C3.	3-23 pF Air Trimmer	C64.	400 pF Silvered Mica ± 2%
C4.	3-23 pF Air Trimmer	C65.	-01 mfd Tub. paper
C5.	3-23 pF Air Trimmer	C66.	·1 mfd Tub. paper
C6.	3-23 pF Air Trimmer	C67.	·1 mfd Tub. paper
C7.	100 pF Silvered Mica	C68.	400 pF Silvered Mica ± 2%
C8.	-0005 mfd Moulded Mica	C69.	400 pF Silvered Mica ± 2%
C9.	10-367-75 pF 1st R.F. Sect. 4 Gang	C70.	20 pF Silvered Mica
C10.	25 pF Silvered Mica	C71.	-1 mfd Tub. paper
C11.	-01 mfd Tub. paper	C72.	100 pF Silvered Mica
C12.	01 mfd Tub. paper	C73.	100 pF Silvered Mica
C13.	·1 mfd Tub. paper	C74.	-1 mfd Tub. paper
C14.	-0005 mfd Moulded Mica	C75.	-1 mfd Tub. paper
C15.	·1 mfd Tub. paper	C76.	-01 mfd Tub. paper
C16.	·1 mfd Tub. paper	C77.	30 mfd Tub. Elect. 15V. D.C. Wkg.
C17.	20 pF Silvered Mica	C78.	8 mfd Tub. Elect.
C18.	3-23 pF Air Trimmer	C79.	-01 mfd Moulded Mica
C19.	6 pF Silvered Mica	C80.	-01 mfd Moulded Mica
C20.	3-23 pF Air Trimmer	C81.	7,000 pF Silvered Mica ± 1%
C21.	3 pF Silvered Mica	C82.	7,000 pF Silvered Mica ± 1%
C22.	3-23 pF Air Trimmer	C83.	30 mfd Tub. Elect. 15V. D.C. Wkg.
C23.	3 pF Silvered Mica	C84.	-01 mfd Moulded Mica
C24.	3-23 pF Air Trimmer	C85.	3-23 pF Air Trimmer
C25.	3-23 pF Air Trimmer	C86.	20 pF Silvered Mica
C26.	10-367-75 pF 2nd. R.F. Sect. 4 Gang	C87.	-01 mfd Moulded Mica
C27.	25 pF Silvered Mica	C88.	7,000 pF Silvered Mica ± 1%
C29.	·1 mfd Tub. paper	C89.	3-23 pF Air Trimmer
C30.	-01 mfd Tub. paper	C90.	3-23 pF Air Trimmer
C31.	100 pF Silvered Mica	C91.	3,625 pF Silvered Mica ± 1%
C32.	·1 mfd Tub. paper	C92.	1,625 pF Silvered Mica ± 1%
C33.	·1 mfd Tub. paper	C93.	10 pF Silvered Mica
C34.	20 pF Silvered Mica	C94.	3-23 pF Air Trimmer
C35.	3-23 pF Air Trimmer	C95.	900 pF Silvered Mica ± 1%
C36.	20 pF Silvered Mica	C96.	20 pF Silvered Mica ± 1%
C37.	6 pF Silvered Mica	C97.	3-23 pF Air Trimmer
C38.	3-23 pF Air Trimmer .	C98.	440 pF Silvered Mica ± 1%
C39.	3 pF Silvered Mica	C99.	20 pF Silvered Mica ± 1%
C40.	3-23 pF Air Trimmer	C100.	3-23 pF Air Trimmer
C41.	3 pF Silvered Mica		200 pF Ceramic
C42.	3-23 pF Air Trimmer	C102.	10-367-75 pF Osc. Sect. 4 Gang
C43.	3-23 pF Air Trimmer	C103.	12 pF Ceramic
C44.	1 mfd Tub. paper	C104.	1 mfd Tub. paper
C45.	400 pF Silvered Mica ± 2%	C105.	-0005 mfd Moulded Mica
C46.	800 pF Silvered Mica ± 2%		-0005 mfd Moulded Mica
C47.	800 pF Silvered Mica ± 2%	C107.	50 pF Ceramic
C48.	Crystal Phasing Cond.		-002 mfd Moulded Mica
C50.	10-367-75 pF Frq. change sect. 4 Gang		-01 mfd Moulded Mica
C51.	25 pF Silvered Mica	C110.	8 pF Silvered Mica
C52.	·01 mfd Tub. paper	C111.	100 pF Silvered Mica
C53.	·01 mfd Tub. paper	C112.	B.F.O. Pitch Cond.
C54.	1 mfd Tub. paper	C113.	100 pF Silvered Mica
C55.	·1 mfd Tub. paper		-01 mfd Tub. paper
C56.	10 pF Ceramic		·01 mfd Tub. paper
C57.	·01 mfd Tub. paper	C116.	-01 mfd Tub. paper
C58.	01 mfd Moulded Mica	C117.	16 mfd Tub. Elect. 450V. D.C. Wkg.
C59.	20 pF Silvered Mica		40 mfd Tub. Elect. 350V. D.C. Wkg.
	70	C119.	-01 mfd Tub. paper

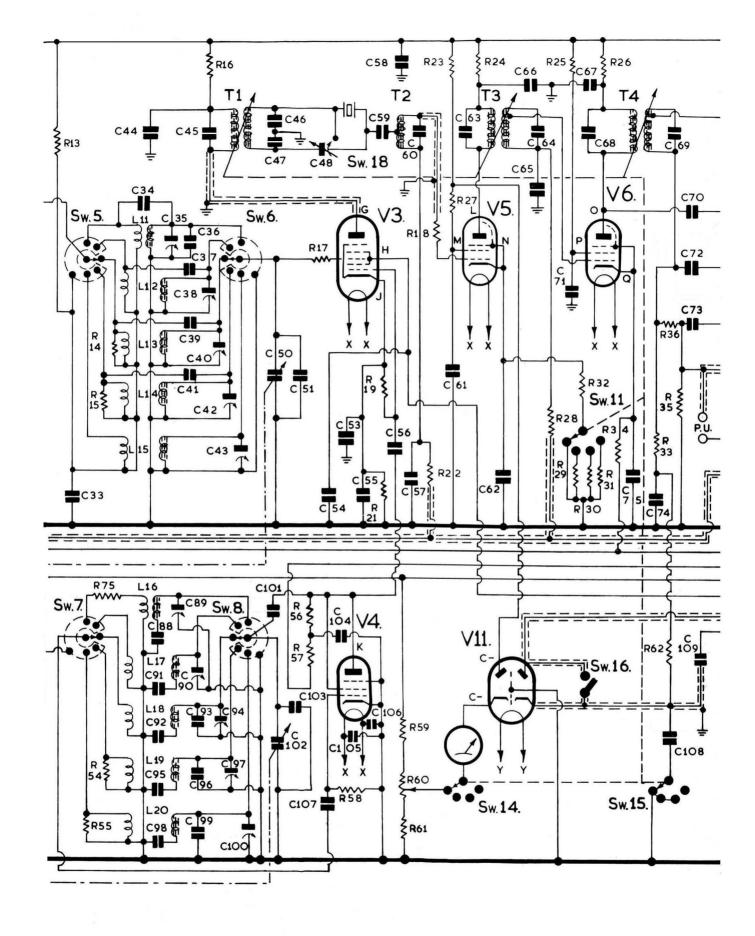
RESISTORS.

R1.	12 ohms		R40.	·5 Megohm. Potentio	meter
R2.	-47 Megohm		R41.	1 Megohm	
R3.	-47 Megohm		R42.	47 Megohm	
R4.	68 ohms		R43.		
R5.	33,000 ohms.	1W	R44.	2,200 ohms	
R6.	1,000 ohms		R45.	1 Megohm	
R7.	150 ohms		R46.	1 Megohm	
R8.	12 ohms		R47.	-47 Megohm	
R9.	·47 Megohm		R48.	680 ohms	
R11.	68 ohms		R49.	47,000 ohms	
R12.	33,000 ohms.	1W	R50.	4,700 ohms	
R13.	1,000 ohms		R51.	1 Megohm	
R14.	1,000 ohms		R52.	·1 Megohm	
	150 ohms		R53.		
R16.	1,000 ohms		R54.	2,200 ohms	
R17.	12 ohms		R55.	2,200 ohms	
	-1 Megohm		R56. R57.	10,000 ohms	
R20.	·47 Megohm		R57.	1,000 ohms	
R21.	150 ohms		R58.	22,000 ohms	
R22.	-47 Megohm		R59.	10,000 ohms	
R23.	15,000 ohms		R60.	5,000 ohms. Potentie	ometer
R24.	1,000 ohms		R61.		
	33,000 ohms.	1W	R62.		
R26.	1,000 ohms		R63.		
R27.	15,000 ohms		R64.		
R28.	·47 Megohm		R65.	10,000 ohms. Potent	iometer
R29.	820 ohms		K66.	2,700 ohms. Wire V	/ound
R30.	3,300 ohms			4,700 ohms	
	1,200 ohms		R68.		
R32.	68 ohms		R69.		
R33.	1 Megohm		R70.	5 ohms. Potentiome	ter
R34.	68 ohms		R71.		
R35.	-1 Megohm		R72.	-1 Megohm	
R36.	·1 Megohm		R73.	6,800 ohms	
R37.	10,000 ohms		R74.		
R38.	·22 Megohm			47 ohms	
R39.	-1 Megohm		R76.	3 Megohms	
	100 N		R18	12 shows	

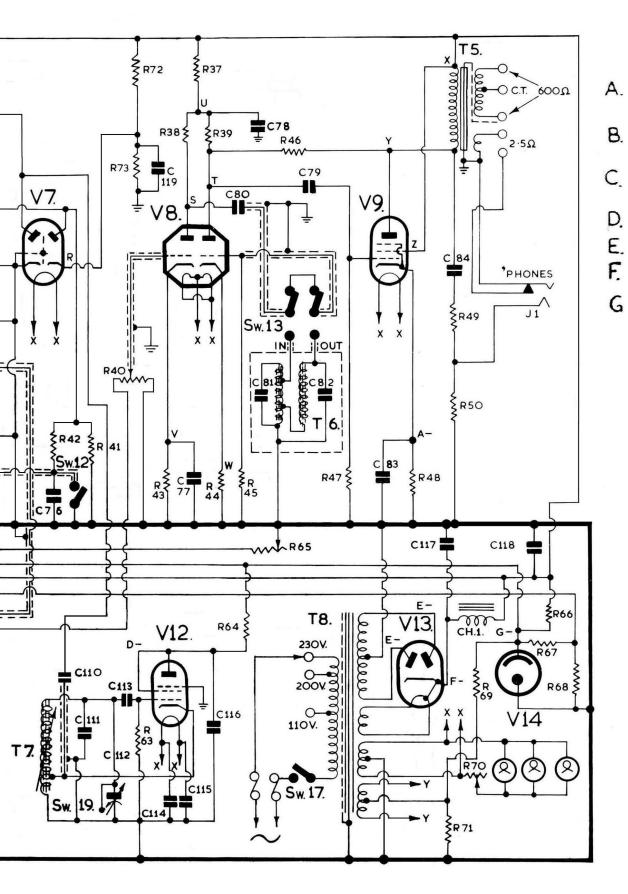


B9A SERIES.

COMMUNICATIO



NS RECEIVER TYPE 730/1A & 730



SCREENING FROM GRIDS OF V8 & FROM C 80 ADDED W.J.S. 3-12-53 HEATER OF V8 WAS TO EARTH W.J.S. 3-9-54 RIO&C 28 DELETED R74 ADDED. WAS TYPE 730/1 wJ.S. 28-9-54 R75 ADDED W.J.S 2-1-55 R76 ADDED W.J.S. 1-6-55. R18 & C49 DELETED 20-9-55. R.S.S. R18 & SCREEN LEADS ADDED. R.S.S. 20-10-55 \$730/IA STRATTON & CO LTD BIRMINGHAM ENGLAND DRAWING NO BP826 DRAWN W.J.S. TRACED R.S.S. 29-8-55

CHECKED T.M. 21-2-07

22-9-53

APPROVED DATE

REVISIONS

2 (co-ax input.)

BP826.